CLAIMS

What is claimed is:

1. A digital processing device to process media data, the device including:

a plurality of processing modules to process the media data; and

a data path to communicate data between the processing modules, wherein the data path is arranged in a ring configuration.

2. The device of claim 1, wherein the data path defines a media data path including a digital audio bus that serially interconnects the plurality of processing modules.

3. The device of claim 2, wherein the digital audio bus communicates digital audio data in a plurality of time-slots, each particular processing module having at least one programmable or fixed time-slot from which data is received from the data path for processing by the particular processing module.

4. The device of claim 2, wherein the digital audio bus communicates digital audio data in a plurality of time-slots, each particular processing module being assigned at least one time-slot into which data processed by the particular processing module is exported to the digital audio bus

5. The device of claim 3, wherein one of the processing modules is a Digital Signal Processor (DSP) and the data path communicates processing

control data in a plurality of time-slots that are allocated to the processing modules under control of the DSP.

6. The device of claim 1, wherein the data path is a time division multiplexed bus including a plurality of audio channels.

7. The device of claim 1, wherein the data path communicates data between the plurality of processing modules at bit rates that differ.

8. The device of claim 7, wherein the media data path includes a total number of time-slots for communicating media data at a plurality of different bit rates, and wherein the sum of a number of time-slots allocated to each one of the plurality of bit rates equals the total number of time-slots.

9. The device of claim 1, wherein each processing module:

selectively extracts media data for processing from the data path, the media data being provided in at least one time-slot of the data path allocated to the processing module;

selectively inserts processed media data into its allocated time-slot; and

passes media data that it receives and that is associated with other processing devices unchanged along the data path.

10. The device of claim 1, wherein the number of processing modules connected along the data path is configurable, each processing module included in the device being allocated at least one time-slot provided by the data path.

11. The device of claim 1, wherein the data path includes a control data path to communicate processing control data to at least one processing module, the processing control data being used by the processing module to process digital data received from the data path.

12. The device of claim 11, wherein the processing control data includes parameters for digital signal processing by the processing module.

13. The device of claim 12, wherein the parameters include at least one of filter parameters, time delay parameters, mixing parameters, and sample-rate conversion parameters.

14. The device of claim 11, wherein the processing control path is a time division multiplexed bus arranged in a ring configuration.

15. The device of claim 11, wherein the processing control data includes streams of processing control data each of which is associated with a stream of media data communicated via the data path, each stream of processing control data being destined for an associated target processing module to which the stream of media data is communicated.

16. The device of claim 15, wherein each stream of processing control data is arranged to be communicated via the control data path to arrive at its associated target processing module prior to a source processing module exporting the media data to the media data path.

17. The device of claim 1, wherein the data path includes:

a plurality of media channels defined by time division multiplexed time-slots; and

a channel identification path including channel identification data to identify each media channel to the processing modules.

18. The device of claim 17, wherein the data path includes a control data path to communicate processing control data to at least one processing module, the control data path including a plurality of control channels defined by time division multiplexed time-slots, wherein the channel identification path identifies both the media channels and the control channels.

19. The device of claim 1, wherein the data path includes a transport bus to communicate data between an external memory and at least one of the plurality of processing modules.

20. The device of claim 1, wherein the processing modules are digital audio processing modules selected from the group consisting of an audio memory transport module, a digital delay line module, a sample rate converter module, a filter module, a mixer module, a DSP module, and a digital Input/Output module.

21. The device of claim 1, wherein the data path and the processing modules are provided in a very large scale integration (VLSI) device.

22. A digital processing device to process media data, the device including:

a plurality of processing modules to process the media data;

a media data path to communicate the media data between the processing modules;

a processing control data path to communicate processing control data between the processing modules, wherein the processing control data defines processing functionality at an associated processing module; and

a routing controller to route the media data and the processing control data to an associated processing module.

23. The device of claim 22, wherein the media data path and the processing control path are arranged in a ring configuration.

24. A method to communicate media data between a plurality of processing modules in a digital media processing device, the method including:

providing the media data to a data path at a source processing module, the data path interconnecting the plurality of processing modules;

extracting the media data at a target processing module of the plurality of processing modules; and

providing processed media data to the data path for communication to another target processing module.

25. The method of claim 24, which includes communicating the media data sequentially between the plurality of processing modules.

26. The method of claim 24, wherein the data path includes a processing module identifier that identifies the source processing module that provides the media to the data path.

27. The method of claim 24, which includes passing on media data received at a particular processing module to another processing module when the processing module receiving the media data is not the target processing module.

28. The method of claim 24, wherein the data path includes a plurality of time-slots, the method including providing the processed media data into a time-slot associated with a source processing module.

29. The method of claim 24, wherein the data path includes a digital media path and a processing control path, the method including:

providing the media data in the form of audio data to the digital media path; and

providing processing control data to the processing control data path, the processing control data controlling the processing of the audio data by the target processing module.

30. The method of claim 24, which includes providing the media data in at least one time-slot of a digital audio bus defined by the data path, each particular processing module having at least one programmable or fixed time-slot from which data is received from the digital audio bus for processing by the particular processing module.

31. The method of claim 24, which includes assigning each particular processing module at least one time-slot of a digital audio bus defined by the data path, wherein digital audio data processed by the particular processing module is exported to the time-slot.

32. The method of claim 31, wherein one of the processing modules is a Digital Signal Processor (DSP), the method including communicating processing control data via the data path in a plurality of time-slots that are allocated to the processing modules under control of the DSP.

33. The method of claim 24, wherein the data path is time division multiplexed bus including a plurality of audio channels.

34. The method of claim 24, which includes communicating data between the plurality of processing modules at bit rates that differ.

35. The method of claim 32, wherein the data path includes a total number of time-slots for communicating media data at a plurality of different bit rates, the method including allocating a number of time-slots to each one of the plurality of bit rates so that a sum of the number of slots allocated to the plurality of bit rates equals the total number of time-slots.

36. The method of claim 24, wherein the number of processing modules connected along the data path is configurable, the method including allocating at least one time-slot provided by the data path to each processing module.

37. The method of claim 24, which includes communicating processing control data to at least one target processing module via a control data path, the processing control data being used by the target processing module to process digital data received from a media data path.

38. The method of claim 37, which includes processing the media data using the processing control data that includes parameters for digital signal processing.

39. The method of claim 38, which includes communicating parameters including at least one of filter parameters, time delay parameters, mixing parameters, and sample-rate conversion parameters to a processing module via the control data path.

40. The method of claim 37, which includes communicating the processing control data in a time division multiplexed fashion.

41. The method of claim 37, wherein the processing control data includes streams of processing control data each of which is associated with a stream of media data communicated via the media data path, each stream of processing control data being destined for an associated target processing module to which the stream of media data is communicated.

42. The method of claim 41, which includes communicating each stream of processing control data via the control data path to arrive at its target processing module prior to exporting the media data from its source processing module to the media data path.

43. The method of claim 24, wherein the data path includes:

a plurality of media channels defined by time division multiplexed time-slots; and

a channel identification path including channel identification data to identify each media channel to the processing modules.

44. The method of claim 43, which includes communicating processing control data to at least one target processing module via a control data path, the control data path including a plurality of control channels defined by time division multiplexed time-slots, wherein the channel identification path identifies both the media channels and the control channels.

45. The method of claim 24, which includes communicating data between an external memory and at least one of the plurality of processor modules via a transport bus.

46. The method of claim 24, which includes communicating media data between digital audio processing modules selected from the group consisting of an audio memory transport module, a digital delay line module, a sample rate converter module, a filter module, a mixer module, a DSP module, and a digital Input/Output module.

47. A machine-readable medium embodying a sequence of instructions that, when executed by the machine, cause the machine to:

provide media data to a data path at a source processing module, the data path interconnecting a plurality of processing modules;

extract the media data at a target processing module of the plurality of processing modules; and

provide processed media data to the data path for communication to another target processing module.

48. The machine-readable medium of claim 47, wherein the media data is communicated sequentially between the plurality of processing modules.

49. The machine-readable medium of claim 47, wherein the data path includes a processing module identifier that identifies the source processing module that provides the media to the data path.

50. The machine-readable medium of claim 47, wherein media data received at a particular processing module is passed on to another processing module when the processing module receiving the media data is not the target processing module.

51. The machine-readable medium of claim 47, wherein the data path includes a plurality of time-slots and the processed media data is provided in a time-slot associated with a source processing module.

52. The machine-readable medium of claim 47, wherein the data path includes a digital media path and a processing control path, the instructions causing the machine to:

provide the media data in the form of audio data to the digital media path; and

provide processing control data to the processing control data path, the processing control data controlling the processing of the audio data by the target processing module.

53. The machine-readable medium of claim 47, wherein the media data is provided in at least one time-slot of a digital audio bus defined by the data path, each particular processing module having at least one programmable or fixed time-slot from which data is received from the digital audio bus for processing by the particular processing module.

54. The machine-readable medium of claim 47, wherein each particular processing module is assigned at least one time-slot of a digital audio bus defined by the data path, and wherein digital audio data processed by the particular processing module is exported to the programmable time-slot.

55. The machine-readable medium of claim 54, wherein one of the processing modules is a Digital Signal Processor (DSP), and wherein processing control data is communicated via the data path in a plurality of time-slots that are allocated to the processing modules under control of the DSP.

56. The machine-readable medium of claim 47, wherein the data path is a time division multiplexed bus including a plurality of audio channels.

57. The machine-readable medium of claim 47, wherein data is communicated between the plurality of processing modules at bit rates that differ.

58. The machine-readable medium of claim 55, wherein the data path includes a total number of time-slots for communicating media data at a plurality of different bit rates, and wherein a number of time-slots are allocated to each one of the plurality of bit rates so that a sum of the number of time-slots allocated to each one of the plurality of bit rates equals the total number of time-slots.

59. The machine-readable medium of claim 47, wherein the number of processing modules connected along the data path is configurable and

wherein at least one time-slot is provided by the data path to each processing module.

60. The machine-readable medium of claim 47, wherein processing control data is communicated to at least one target processing module via a control data path, the processing control data being used by the target processing module to process digital data received from a media data path.

61. The machine-readable medium of claim 60, wherein the media data is processed using the processing control data that includes parameters for digital signal processing.

62. The machine-readable medium of claim 61, wherein parameters including at least one of filter parameters, time delay parameters, mixing parameters, and sample rate conversion parameters are communicated to a processing module via the control data path.

63. The machine-readable medium of claim 60, wherein the processing control data is communicated in a time division multiplexed fashion.

64. The machine-readable medium of claim 60, wherein the processing control data includes streams of processing control data each of which is associated with a stream of media data communicated via the media data path, each stream of processing control data being destined for an associated target processing module to which the stream of media data is communicated.

65. The machine-readable medium of claim 64, which includes communicating each thread of processing control data via the control data path to arrive at its target processing module prior to exporting the media data from its source processing module to the media data path.

66. The machine-readable medium of claim 47, wherein the data path includes:

a plurality of media channels defined by time division multiplexed time-slots; and

a channel identification path including channel identification data to identify each media channel to the processing modules.

67. The machine-readable medium of claim 66, wherein processing control data is communicated to at least one target processing module via a control data path, the control data path including a plurality of control channels defined by time division multiplexed time-slots, wherein the channel identification path identifies both the media channels and the control channels.

68. The machine-readable medium of claim 45, wherein data is communicated between an external memory and at least one of the plurality of processor modules via a transport bus.

69. The machine-readable medium of claim 45, media data is communicated between digital audio processing modules selected from the group consisting of an audio memory transport module, a digital delay line module, a sample rate converter module, a filter module, a mixer module, a DSP module, and a digital Input/Output module.